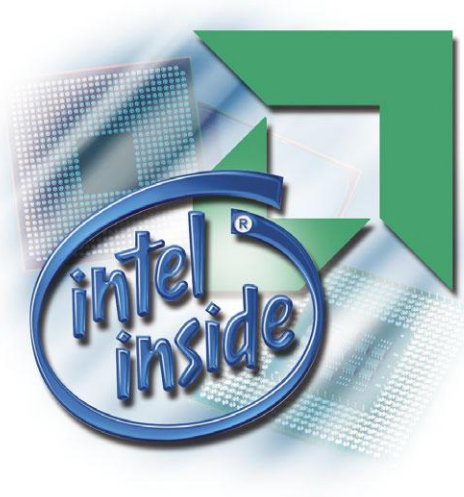

Processing The Processors

Discover What New CPUs Have To Offer

Some people spend their days drooling over expensive, high-end PCs, models with cutting-edge processors and gigabytes of RAM—and that's fine. But there's something to be said for good, low-end computers: They're inexpensive, pretty powerful, and just plain useful for everyday computing tasks. The introduction of the AMD Sempron and Intel Celeron D processors, two lines of entry-level CPUs, has led to a new generation of value-priced PCs.

It's an old adage that when it comes to processors, faster is better, but processor speeds have increased so far that even slower, entry-level processors provide more than enough computing power for the tasks most of us perform. Certainly, number-crunching scientists, Photoshop gurus, and video editors may need the fastest processors possible, but those chips are overkill for average home and office computer users.

The Celeron D line, released in mid-2004, replaced Intel's previous and popular Celeron line of value-priced CPUs. Celeron D is the baby brother of Intel's more powerful Pentium 4. The Sempron, AMD's answer to Celeron D, followed, replacing the older Athlon XP line. On the other end of AMD's spectrum is the Athlon 64, cutting-edge 64-bit chips.

Less expensive chips mean less expensive computers. Sempron and Celeron D PCs are often available for $300 to $600. For example, the Dell Dimension 3000, with a 2.4GHz Celeron D processor, costs just under $500. The Gateway 3200S, with a 2.66GHz Celeron D, costs about $400. Monarch Computer's Monarch 2400+ system, with an AMD Sempron CPU, goes for $369.

Head-To-Head Comparison

To compare the two processors, we started with two similar PCs from CPU Solutions (http://www.cpusolutions.com). In this corner, in the beige case, the Intel Celeron D 320 processor, running at 2.4GHz. In the other corner, in the black case, the AMD Sempron 2400+ processor. Other than the processors, both systems are very similar, using the onboard video of the Biostar motherboards (model M7VIG 400 in the AMD system and U8668D-V7 in the Intel), 40GB Seagate hard drives, and 512MB DDR SDRAM. We installed Windows XP Home Edition on both computers.

Aside from the case color and brand of entry-level processor inside, these two PCs from CPU Solutions are virtually identical.

The Sempron 2400+ actually runs at 1.66GHz. Is that a fair fight compared to Intel's 2.4GHz processor? AMD says that it is. AMD uses a "performance index" to gauge the speed of its chips, saying that design efficiencies, such as the ability to move data to memory more quickly, make it equivalent to a faster Intel chip. We held it to the claim, comparing the 2400+, its 2.4GHz-equivalent processor, to an Intel chip that actually runs at 2.4GHz.

The specs aren't bad, but the prices will make even the most frugal geek take notice: The Sempron system costs $299, and the Celeron D costs $329. But how do these machines perform?

To find out, we tested the processors with common real-world applications: working with OpenOffice.org, a popular office suite; surfing with various Web browsers; flying around with Microsoft Flight Simulator 2 004; and editing graphics with Paint Shop Pro.

We started with OpenOffice.org: Both processors were more than capable of managing text, spreadsheets, and presentations and kept pace every step of the way without a trace of sluggishness. Similarly, browsing the Web with Internet Explorer and Mozilla Firefox was speedy on both machines.

Paint Shop Pro was next, and both processors again proved themselves to be more than capable enough for the chore. For everyday photo editing and creating Web graphics, the processors did the job equally well. They're fine

for cropping pictures, sharpening images, and other basic functions that you might do when working with pictures from your digital camera. Users who spend all day running huge files though complex filters will probably want a Pentium 4 or Athlon 64 processor, but for everyday graphics tasks, the low-end processors are fine.

Flight Simulator was perhaps the biggest challenge we threw at the processors. Both proved to be up to the task, proving smooth simulation and beautiful, jitter-free graphics. AMD chips often top gaming benchmarks, and the Sempron did have the edge with flight simulation. The frame rate on the AMD machine was slightly higher, providing smoother animation, but not by much. (In fact, both machines worked so well that it took far longer to write this paragraph than it should have, as we flew around the Hawaiian Islands simultaneously in two Cessnas. And miraculously, crashed neither.)

With the exception of the flight simulator, we couldn't tell the two processors apart in these subjective head-to-head comparisons. They both are adequate for the tasks that most home and office computer users need.

These processors are not for everyone. Although they provide ample muscle for most of us enjoying Flight Simulator, The Sims, and other typical games, hard-core gamers intent on getting the maximum frame rate from **first-person shooters** (a game in which the player sees the game the way the character in the game would) may not agree. Watching full-screen DVDs can lead to choppy playback, and editing video will be painfully slow for complex projects.

With both processors, Flight Simulator was smooth and crash-free (in every sense of the word).

Benchmarking

Real-world tests are one thing, but some people prefer objective numbers. We compared the processors using the PCMark04 benchmark (http://www.futuremark.com). The result was almost a tie, with the Sempron chip just edging out the Celeron D chip. The benchmark gave the Sempron a score of 2096, and 2068 to the Celeron system. In individual tests, the numbers were often photo-finish close, with the Celeron excelling in certain tests such as file decryption and image processing, and the Sempron ahead in others, including 3D calculation and audio conversion. All in all, the Sempron won the benchmark by a nose.

For comparison, high-end chips can get PCMark scores in the 4000s or higher. A Dell Precision 370 with a 3.6 GHz Pentium 4 processor weighs in with a score of 4985, and an ABS Ultimate M5 system, with an AMD Athlon 3500+ chip, scored 4312. Those systems, however, are neither "entry-level" nor "value-priced." They cost $4,600 and $2,000, respectively. To be fair, those PCs include a lot of other features that under-$500 PCs lack, such as huge SATA hard drives, a lot more memory, and DVD burners. The question when considering any PC or processor upgrade is: Just what level of performance do you realistically need for your computing tasks?

Up To The Task

Both chips do a fine job of performing basic computing tasks and running games that don't demand the utmost in processor performance. For everyday computing needs, such as accessing the Internet, word processing, working in Excel, and gaming, the Celeron D and Sempron are inexpensive and capable processors that demand little in the way of compromise. ▮

BY KEVIN SAVETZ

A CPU Rundown

Here's a roundup of the current Sempron and Celeron D lineups. The price column reflects the lowest price available among major online sellers.

Level 2 cache is ultra-fast memory that buffers information being moved between the processor and standard memory. Performance index speed is the clock speed that AMD says each chip is equivalent to.

AMD Sempron

Model	Performance index speed	Clock speed	Level 2 Cache	Price
2200+	2.2GHz	1.5 GHz	256KB	$46
2300+	2.3GHz	1.583 GHz	256KB	$50
2400+	2.4GHz	1.677 GHz	256KB	$61
2500+	2.5GHz	1.750 GHz	256KB	$73
2600+	2.6GHz	1.833 GHz	256KB	$83
2800+	2.8GHz	2.0 GHz	256KB	$107
3000+	3GHz	2.0 GHz	512KB	$130

Intel Celeron D

Model	Clock speed	Level 2 Cache	Price
315	2.26GHz	256KB	$66
320	2.4GHz	256KB	$76
325	2.53GHz	256KB	$85
330	2.66GHz	256KB	$85
335	2.8GHz	256KB	$94
340	2.93GHz	256KB	$124
345	3.06GHz	256KB	$130